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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,829	08/21/2002	Chellappa Balan	124719	9788

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EXAMINER

DOVE, TRACY MAE

ART UNIT PAPER NUMBER

1745

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/064,829

Applicant(s)

BALAN, CHELLAPPA

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/13/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the communication filed on 5/26/06. Applicant's arguments have been considered, but are moot in view of the new grounds of rejection. Claims 1-14 are pending. This Action is made FINAL.

Specification

The specification is objected to because Figure 1 does not show "disposing the upper ribs 140 of cooling apparatus 100 over the anode 220". Figure 1 shows the upper ribs 140 are disposed over the cathode 200, not the anode 220. Furthermore, the disclosure of "220 (not shown) is objected to because reference numeral 220 is shown in the Figures.

Claims Analysis

The limitation "disposed to allow a flow of a fluid therethrough for heat transfer between said fluid and said fuel cell components" in claim 1 is not given patentable weight because the claim is directed toward an apparatus. Similarly, in claim 3 "so as to cause hydrodynamic interactions and affect the heat transfer rate within said fuel cell components" is not given patentable weight because the limitation does not limit the claimed "apparatus". Note these limitation are also contained in claims 7 and 10, respectively. The limitation regarding heat transfer and hydrodynamic interactions in claim 12 is not given patentable weight.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 7 recite “a lower channel parallel to said upper serpentine channel”, which is indefinite. It is unclear how a channel is parallel to a serpentine channel. Specifically, as shown in Figure 1 the serpentine channel runs up/down and left/right.

Claims 3 and 10 recite “affect the heat transfer rate”, which is indefinite because it is unclear how the concavities on a surface portion of each of the upper channel and lower channel affect the heat transfer rate *within said fuel cell components* or *within said fuel cell assembly*. It is unclear what encompasses “within said fuel cell components” or “within said fuel cell assembly”. The claim should be amended to clearly define the elements of the fuel cell assembly that are involved in the claimed “heat transfer” and how the concavities “affect” the heat transfer rate of the fuel cell elements. Similarly, claim 12 recites “affect the heat transfer rate”, which is indefinite because it is unclear how the concavities on a surface portion of the fuel cell electrode affect the heat transfer rate within said fuel cell assembly.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1, 2, 5-9, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al., US 5,998,054 in view of Kusunoki et al., US 5,789,094, and further as evidenced by the present specification, [0002].

Jones teaches a polymer electrolyte fuel cell comprising an anode, a cathode and an electrolyte. Figure 4 shows a fuel cell fluid flow plate 120'' (base plate) comprising a first face 122 (upper section) and a second face 122'' (lower section) wherein the first face 122 comprises serpentine flow channels 124'' (upper channel) and the second face 122'' comprises channels 140'' (lower channel). The channels 124'' and 140'' are fluidly connected by an injection port 131'' (cavity) (7:44-50). The injection of water through the port affects the heat transfer between the reactant fluid in the flow plate channels 124'' and a fuel cell component (4:55-61). The fluid flow plate 120 may be a bipolar, monopolar, anode cooler or cathode cooler plate. Face 122 is an anode side or cathode side of the fluid flow plate. The flow channels carry an appropriate reactant fluid such as hydrogen or air/oxygen (5:33-45). See column 6, lines 50-65. Where the fluid flow plate 120 is a bipolar plate, an opposite face 122' (not shown) similarly can have a metering area 130' positioned approximately at inlets 126' of flow channels 124', as will be understood by those skilled in the art. For instance, a repetition of the machining pattern depicted on Fig. 2 on the opposite face of that same fluid flow plate desirably would provide a metering area at a consecutive corner of the plate, which would allow convenient connection to another fluid manifold for supply of an appropriate reactant fluid (7:5-15). Additionally, working section 114 could easily include fuel cells other than PEM-type fuel cells (8:28-29).

Jones does not explicitly state the upper channel and the lower channel are provided in a parallel arrangement.

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However, Kusunoki teaches fuel cells having oxidant gas flow and fuel gas flow may have a cross flow in the electrode planes with the electrolyte matrix between, but a parallel flow type which supply the fuel gas and the oxidant gas from the same direction and a counter flow type which supply them from opposite sides respectively can get the same effect (22:45-64). Kusunoki teaches flow plates may be made of copper, nickel and/or stainless steel (16:29-59).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to modify Jones to effect parallel flow channels because cross flow, counter flow and parallel flow channels are well known in the art and Kusunoki teaches one of skill can reasonably expect the same effect. Furthermore, the present specification teaches fuel cell stacks typically comprise planar cross flow fuel cells, counterflow fuel cells or parallel flow fuel cells (0002).

Response to Arguments

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 9, 2006



TRACY DOVE
PRIMARY EXAMINER